



ARL is an Authority on Nutrition and the Science of Balancing Body Chemistry Through Hair Tissue Mineral Analysis!

Hair Tissue Mineral Analysis


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Sodium and The Adrenal Glands

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Sodium and The Adrenal Glands

Approximately 95% of all hair mineral analyses reviewed at Analytical Research Labs (ARL) reflect impaired adrenal glandular activity. Some claim that one cannot assess adrenal activity from a hair mineral test however, when hair is not washed at the laboratory, adrenal assessment is one of the most important uses for hair analysis and an excellent reason to use Analytical Research Labs instead of other laboratories.

Adrenal Physiology

The adrenal glands produce a variety of hormones including the fast-acting stress hormones, adrenaline and nor-adrenaline, and the slower acting glucocorticoid hormones, cortisol and cortisone. In addition, the adrenals produce aldosterone, a mineralocorticoid hormone.

Many nutrients are required to produce these hormones, including vitamins A, C, E, pantothenic acid and other B-complex vitamins. The adrenal glands can become nutritionally depleted or toxic. Toxic metals that may accumulate in the adrenal glands include lead, cadmium, mercury and aluminum. These can cause either reduced or excessive activity of the adrenal glands.

The adrenal glands are an important part of the sympathetic or fight/flight branch of the autonomic nervous system. Their effects include raising blood pressure and blood sugar, and raising the sodium level which depresses calcium and magnesium levels. This brings the nervous system to a heightened state of readiness and responsiveness.

Symptoms of adrenal dysfunction often include fatigue, allergies, joint pain, depression and low blood sugar. These are among the most common complaints in doctor's offices.

The Adrenals And Hair Analysis

Aldosterone, the primary mineralocorticoid secreted by the adrenal glands, causes sodium retention by the kidneys. As long as hair is not washed at the laboratory, the hair sodium level tends to reflect aldosterone activity.

The hair potassium level roughly correlates with cortisol activity. With adrenal exhaustion, both hair sodium and potassium levels tend to be low. In late stages of stress, according to Selye, (*The Stress of Life* and other works), cortisol levels rise again and are reflected on a hair analysis by potassium rising in relation to sodium. This is called an inverted sodium/potassium ratio, an indicator of chronic stress.

Washing the hair at the laboratory erratically removes water-soluble elements, especially sodium and potassium. Some labs choose to wash the hair before testing. Labs that wash the hair insist that hair sodium and potassium readings are unreliable. It is not true of an analysis by Analytical Research Labs. With the ARL test, *the sodium level and its ratios are often the most important readings on the test*. Most people are unaware of this important difference in hair analysis lab procedures.

Other Factors That Affect The Sodium Level

In addition to aldosterone, the following may elevate a hair sodium reading.

- **Toxic metals** can elevate the sodium level. Those that may elevate sodium include *cadmium, mercury, aluminum and nickel*. Whenever these are present, the sodium level is in fact not as high as it appears. Often, on a retest, a sodium level will decrease as toxic metals are eliminated. A diet and supplement program can assist the adrenal glands, and the sodium level will be maintained or perhaps increase even as toxic metals are eliminated.
- **Excesses of physiological minerals also elevate the sodium level.** These include manganese, copper, iron, chromium and selenium. Any time one observes an elevated level of any of these minerals, the sodium level is in fact not as high as it appears. Once again, as excess physiological minerals are eliminated, the sodium level may decrease.
- **Hidden toxic or physiological minerals may also elevate the sodium level.** Minerals are called 'hidden' when they are present, but not revealed on a hair analysis or on other tests for toxic metals. They are not revealed because they are sequestered deep within other body organs or tissues.

Hidden copper toxicity will raise sodium and is very common in slow metabolizers. In these cases, the copper level appears normal or even low. Hidden manganese, iron, chromium, aluminum and other minerals will also raise sodium.

Minerals may remain hidden for years, even when one is on a corrective nutritional program. They are needed internally to support exhausted adrenal and thyroid glandular activity. This is similar to defective blocks holding up a house. They cannot be removed until the house is shored up and rebuilt.

This can be confusing because the hair analysis may initially show fairly normal levels of sodium, yet the patient may feel tired or have other symptoms of low adrenal activity such as joint pain, allergies, low blood sugar or depression. Over a period of several months to several years, as the sodium-raising excess minerals are removed, the sodium level may appear worse and worse on repeat tests, yet the patient may feel better and better.

- **Stress**, especially acute stress, will elevate a hair sodium reading. Stress forces the adrenal glands to work harder. The stress may be physical such as extreme exercise, drinking coffee or cola beverages, or the use of other stimulants. It may also be emotional, social, financial or another type. Additionally, it may also be nutritional, such as a deficiency of a nutrient required by the adrenal glands.

Adrenal Ratios

Since many factors can affect the sodium level, Dr. Paul Eck discovered that a better indicator of adrenal activity is the *ratios* of sodium to other minerals. This adds complexity to the test interpretation, but is most helpful to assess adrenal activity. The main ratios to consider are *sodium to magnesium* and *sodium to potassium*.

- **The sodium/magnesium ratio.** Sodium and magnesium tend to be antagonistic. As one goes up the other goes down. The ratio of the two minerals often gives a better picture of adrenal activity than the sodium level alone. Called 'the adrenal ratio', we use an ideal ratio of 4.17:1 for sodium/magnesium. As the ratio elevates, it reflects an excessive adrenal effect, while a low ratio indicates under activity. This may not correlate perfectly with blood or saliva tests for adrenal hormones. This is because the latter measure hormones or their metabolites in the blood or other fluids. The hair test measures *tissue effect*.

An individual may have adequate or even excessive hormones in the blood, but they may not be reaching the tissues, or they may not have the proper tissue effect due to impaired cell permeability, impaired energy production in the cells, the presence of other toxins or for other reasons.

- **The sodium/potassium ratio.** The ratio of sodium to potassium reflects many factors related to adrenal glandular activity. A high sodium/potassium ratio represents a tendency for an excess of pro-inflammatory hormones such as aldosterone, in relation to anti-inflammatory adrenal hormones such as cortisol and cortisone. Emotionally, it is associated with acute stress and anger. An elevated ratio is considered better than a low or inverted ratio. When the latter is present, the body is less able to mount an inflammatory response.

A low ratio is a chronic stress indicator, associated with carbohydrate intolerance, exhaustion, cardiac, liver and kidney stress, low gastric hydrochloric acid, an impaired immune system and a tendency for infections. Emotionally it is associated with chronic negative emotions including frustration, resentment and hostility.

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